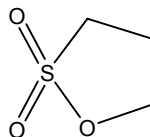


1,3-PROPANE SULTONE

CAS No. 1120-71-4

First Listed in the *Fourth Annual Report on Carcinogens*



CARCINOGENICITY

1,3-Propane sultone is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (IARC V.4, 1974; Weisburger et al., 1981). When administered by gavage, 1,3-propane sultone induced significant increases of malignant gliomas (astrocytomas) of the cerebrum and cerebellum in rats of both sexes and mammary adenocarcinomas in female rats; the incidences of granulocytic leukemia, adenocarcinomas of the small intestine, and squamous cell carcinomas of the ear were somewhat increased in rats of both sexes. Single and repeated subcutaneous injections of 1,3-propane sultone induced myosarcomas, fibrosarcomas, and sarcomas at the injection site in rats. Subcutaneous injections also induced malignant neural tumors, in the offspring of rats. When repeatedly injected subcutaneously, 1,3-propane sultone induced adenocanthomas and sarcomas at the injection site in female mice.

There are no data available to evaluate the carcinogenicity of 1,3-propane sultone in humans (IARC V.4, 1974).

PROPERTIES

1,3-Propane sultone occurs as a colorless liquid or as white crystals. It releases foul odor as it melts. It is readily soluble in water and in many organic solvents such as ketones, esters, and aromatic hydrocarbons. It hydrolyzes to 3-hydroxy-1-propanesulfonic acid. When heated to decomposition, 1,3-propane sultone emits toxic fumes of sulfur oxides (SO_x).

USE

1,3-Propane sultone is used as a chemical intermediate to introduce the sulfopropyl group into molecules and to confer water solubility and an anionic character to the molecules (IARC V.4, 1974). CPSC reported that it is also used as a chemical intermediate in detergents, lathering agents, and bacteriostats and as a corrosion inhibitor for mild (untempered) steel (Kirk-Othmer V.7, 1979).

PRODUCTION

Chem Sources identified two bulk suppliers of 1,3-propane sultone, among the twelve domestic suppliers listed in 1990 (Chem Sources, 1991). In 1988 and 1989 three U.S. suppliers were identified (Chem Sources, 1988; Chem Sources, 1989). There were 11 suppliers of 1,3-propane sultone identified for 1985, but no data were available on the amount imported (Chem Sources USA, 1986). In 1974, the only U.S. producer of 1,3-propane sultone manufactured less

than 500 lb of the chemical annually (IARC V.4, 1974). The 1979 TSCA Inventory identified three U.S. companies importing 1,3-propane sultone in 1977, but no data were available on the amount imported (TSCA, 1979). 1,3-Propane sultone was first produced in the United States in 1963 (IARC V.4, 1974).

EXPOSURE

The primary routes of potential human exposure to 1,3-propane sultone are ingestion and inhalation. In water or moist soil it will rapidly hydrolyze. In atmosphere it will react with photochemically produced hydroxyl radicals (half-life of 8 days). Workers involved in the formulation of compounds made from it or the production of its end products are at the greatest risk of potential exposure to 1,3-propane sultone. ACGIH has not assigned a threshold limit value (TLV) for 1,3-propane sultone because of the lack of epidemiologic data on the effects of the compound on workers. It may occur in the waste streams of plants making or using it but is not expected to remain for protracted periods of time because it is readily hydrolyzed (IARC V.4, 1974). Consumers are potentially exposed to its residues when using detergents, corrosion inhibitors, and other products manufactured from 1,3-propane sultone. 1,3-Propane sultone is not known to occur naturally. The Toxic Chemical Release Inventory (EPA) listed one industrial facility that produced, processed, or otherwise used 1,3-propane sultone in 1996 (TRI, 1999). In compliance with the Community Right-to-Know Program, this facility reported no releases to the environment. .

REGULATIONS

EPA regulates 1,3-propane sultone under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and the Superfund Amendments and Reauthorization Act (SARA). Under RCRA, EPA has designated 1,3-propane sultone as a hazardous constituent of wastes. EPA also controls releases of the compound under SARA and under CERCLA, which has adjusted the reportable quantity (RQ) from 1 lb to 10 lb for the compound. OSHA regulates 1,3-propane sultone as a chemical hazard in laboratories and under the Hazard Communication Standard. Regulations are summarized in Volume II, Table B-127.